CLAIMS

What is claimed is:

1. A circuit board processing system, comprising:

a circuit board fabrication stage configured to fabricate a circuit board having a set of circuit board pads;

a solder fusing stage coupled to the circuit board fabrication stage, the solder fusing stage being configured to (i) apply flux and solder concurrently to the set of circuit board pads, and (ii) activate the flux and melt the solder to form a set of substantially flat solder coatings which is fused to the set of circuit board pads; and

a washing stage coupled to the solder fusing stage, the washing stage being configured to remove contamination from a surface of the circuit board having the circuit board pads and from the set of substantially flat solder coatings which is fused to the set of circuit board pads.

2. The circuit board processing system of claim 1 wherein the solder is a substantially lead-free alloy, and wherein the solder fusing stage is configured to:

integrate a set of layers of the substantially lead-free alloy with the set of circuit board pads.

3. The circuit board processing system of claim 1 wherein the solder fusing stage is configured to:

print a paste onto the set of circuit board pads through a metallic stencil, the paste containing the flux and the solder.

4. The circuit board processing system of claim 3 wherein the paste has a substantially low viscosity, and wherein the solder fusing stage is further configured to:

remove the metallic stencil to enable (i) the paste to substantially slump and (ii) the flux to flow over the set of circuit board pads.

5. The circuit board processing system of claim 3 wherein the solder fusing stage is configured to:

deposit the paste onto the set of circuit board pads through the metallic stencil using a vapor deposition process.

6. The circuit board processing system of claim 5 wherein the solder fusing stage, when depositing the paste, is configured to:

provide an amount of the paste on the set of circuit board pads to leave, as the set of substantially flat solder coatings, a solder layer that is substantially 0.5 mils in thickness on the set of circuit board pads.

7. The circuit board processing system of claim 6 wherein the metallic stencil defines a set of apertures to expose substantially half of a top surface of each circuit board pad; and wherein the solder fusing stage, when providing the amount of the paste, is configured to:

supply the paste through the set of apertures defined by the metallic stencil to cover substantially half of the top surface of each circuit board pad with the paste.

8. The circuit board processing system of claim 7 wherein the solder fusing stage, when supplying the paste through the set of apertures defined by the metallic stencil, is configured to:

distribute a stack of the paste which is substantially 2.0 mils in height over each circuit board pad.

9. The circuit board processing system of claim 1 wherein the washing stage is configured to:

remove the contamination from the set of substantially flat solder coatings prior to mounting circuit board components to the circuit board.

10. The circuit board processing system of claim 1, further comprising:

a protecting stage coupled to the washing stage, the protecting stage being configured to place a protective coating over the circuit board to cover the set of substantially flat solder coatings which is fused to the set of circuit board pads.

11. A method for processing a circuit board having a set of circuit board pads, the method comprising:

applying flux and solder concurrently to the set of circuit board pads;

activating the flux to clean the set of circuit board pads; and

melting the solder to form a set of substantially flat solder coatings which is fused to the set of circuit board pads.

12. The method of claim 11 wherein the solder is a substantially lead-free alloy, and wherein melting includes:

integrating a set of layers of the substantially lead-free alloy with the set of circuit board pads.

13. The method of claim 11 wherein applying the flux and the solder includes:

printing a paste onto the set of circuit board pads through a metallic stencil, the paste containing the flux and the solder.

14. The method of claim 13 wherein the paste has a substantially low viscosity, and wherein applying the flux and the solder further includes:

removing the metallic stencil to enable (i) the paste to substantially slump and (ii) the flux to flow over the set of circuit board pads.

15. The method of claim 13 wherein applying the flux and the solder includes:

depositing the paste onto the set of circuit board pads through the metallic stencil using a vapor deposition process.

16. The method of claim 15 wherein depositing the paste includes:

providing an amount of the paste on the set of circuit board pads to leave, as the set of substantially flat solder coatings, a solder layer that is substantially 0.5 mils in thickness on the set of circuit board pads.

17. The method of claim 16 wherein the metallic stencil defines a set of apertures to expose substantially half of a top surface of each circuit board pad, and wherein providing the amount of the paste includes:

supplying the paste through the set of apertures defined by the metallic stencil to cover substantially half of the top surface of each circuit board pad with the paste.

18. The method of claim 17 wherein supplying the paste through the set of apertures defined by the metallic stencil includes:

distributing a stack of the paste which is substantially 2.0 mils in height over each circuit board pad.

19. The method of claim 11, further comprising:

passing the circuit board through a washing station to wash contamination from a surface of the circuit board having the circuit board pads and the set of substantially flat solder coatings which is fused to the set of circuit board pads.

20. The method of claim 11, further comprising:

placing a protective coating over the circuit board to cover the set of substantially flat solder coatings which is fused to the set of circuit board pads.

21. A circuit board which is configured to be populated by a set of circuit board components, the circuit board comprising:

layers of conductive and non-conductive material sandwiched together to form a rigid support structure;

a set of circuit board pads disposed on an outer surface of the rigid support structure; and

a set of substantially flat solder coatings which is fused to the set of circuit board pads.

22. The circuit board of claim 21 wherein the set of substantially flat solder coatings includes:

a layer of a substantially lead-free alloy integrated with the set of circuit board pads.

23. The circuit board of claim 22 wherein the layer of the substantially lead-free alloy is substantially 0.5 mils in thickness.

24. The circuit board of claim 23 wherein each circuit board pad is formed substantially of a copper alloy, and wherein the layer of the substantially lead-free alloy forms an intermetallic bond with the copper alloy forming each circuit board pad.

25. The circuit board of claim 21, further comprising:

a protective coating which covers the set of substantially flat solder coatings which is fused to the set of circuit board pads.

26. A stencil assembly for use on a circuit board having a set of circuit board pads, the stencil assembly comprising:

a stencil defining a set of apertures that exposes substantially half of a top surface of each circuit board pad of the set of circuit board pads when the stencil is placed over the circuit board;

a frame configured to hold the stencil; and

an interface configured to connect the frame to automated equipment which is capable of moving the stencil over the circuit board and subsequently away from the circuit board.

27. The stencil assembly of claim 26 wherein the stencil further defines a planar shape which is substantially 2.0 mils in thickness.

28. The stencil assembly of claim 26 wherein the stencil defines multiple apertures for a circuit board pad of the set of circuit board pads.

29. A system for making a circuit board module, the system comprising:

a circuit board source configured to provide a circuit board having a set of circuit board pads with a set of substantially flat solder coatings fused to the set of circuit board pads;

a paste printing stage coupled to the circuit board source, the paste printing stage being configured to print paste onto the circuit board, the paste including flux and solder; and

a temperature control stage coupled to the paste printing stage, the temperature control stage being configured to apply heat to activate the flux and the solder to solder the set of circuit board components to the circuit board.

30. The system of claim 29 wherein the set of substantially flat solder coatings includes a layer of substantially lead-free alloy integrated with the set of circuit board pads, and wherein the paste printing stage, when printing the paste, is configured to:

provide the paste over the layer of the substantially lead-free alloy.

31. The system of claim 30 wherein the layer of the substantially lead-free alloy is substantially 0.5 mils in thickness, and wherein the paste printing stage, when providing the paste, is configured to:

putting the paste in contact with the layer of the substantially lead-free alloy which is substantially 0.5 mils in thickness.

32. A method for making a circuit board module, the method comprising:

printing paste over a circuit board having a set of circuit board pads and a set of substantially flat solder coatings which is fused to the set of circuit board pads, the paste including flux and solder;

placing a set of circuit board components in contact with the printed paste; and

applying heat to activate flux and melt the solder to solder the set of circuit board components to the circuit board.

33. The method of claim 32 wherein the set of substantially flat solder coatings includes a layer of substantially lead-free alloy integrated with the set of circuit board pads, and wherein printing the paste includes:

providing the paste over the layer of the substantially lead-free alloy.

34. The method of claim 33 wherein the layer of the substantially lead-free alloy is substantially 0.5 mils in thickness, and wherein the step of providing the paste includes:

putting the paste in contact with the layer of the substantially lead-free alloy which is substantially 0.5 mils in thickness.

35. A circuit board module, formed by a process which comprises:

printing paste over a circuit board having a set of circuit board pads and a set of substantially flat solder coatings which is fused to the set of circuit board pads, the paste including flux and solder;

placing a set of circuit board components in contact with the printed solder paste; and

applying heat to activate flux and melt the solder thus soldering the set of circuit board components to the circuit board.

36. The circuit board module of claim 35 wherein the set of substantially flat solder coatings includes a layer of substantially lead-free alloy integrated with the set of circuit board pads, and wherein printing the paste includes:

providing the paste over the layer of the substantially lead-free alloy.

37. The circuit board module of claim 36 wherein the layer of the substantially lead-free alloy is substantially 0.5 mils in thickness, and wherein the step of providing the paste includes:

putting the paste in contact with the layer of the substantially lead-free alloy which is substantially 0.5 mils in thickness.

38. The circuit board module of claim 37 wherein putting the paste includes:

applying, as the solder of the paste, a substantially lead-free alloy.